Appendix 1: Model fitting, evaluation and plotting

This folder contains the R object 'combined_bc_ai_all_responses.Rdata' (produced by the script '~/Appendix_1_data_extractions_proccessing/data_extract_clean_up_first_pass.R') and six R scripts that use this data object to fit spatially lagged models using MCMC sampling and then explore these fitted models using different plots. These R scripts are:

1. 'non_elast_predict_models.R', which defines the models in JAGS script for each demographic metric, for both 'all_pops' and 'no_self' models, for all the different sets of predictors.

2. 'pop_metric_prediction.R', which calls the JAGS model scripts, does the model fitting and calls the plotting functions which evaluates the models.

3. 'setup_processing_helper_functions.R', which defines functions to that produce evaluation plots, fitted versus observed, discrepancy from simulated data, residual plot and trace plots of MCMC chains. This file also defines functions that set up geographic and phylogenetic distance matrices.

4. 'custom_jags_object_function.R', which defines functions to standardize jags model output so the plotting functions can find the right variables from different jags model outputs.

5. 'plotting_helper_functions.R', a set of functions that do the actual plotting for the results, and also several others we used to explore the model outputs.

6. 'plotting_functions.R', which calls the functions in 'plotting_helper_functions.R' to create the plots, mainly output in .pdf format.

The script in 'pop_metric_prediction.R' calls the JAGS scripts in 'non_elast_predict_models.R' and uses the 'R2jags' interface (Su & Yajima, 2014) to fit the models. The output from these models is saved. This model fitting process takes a long time (days to weeks per model on a desktop computer). To save time we also include these r2jags output objects in the folder '/pre-run_model_output'. These r2jags output objects are taken by the function *custom_jags_object()*, which produces an object that standardizes the names and produces four derived quantities: mean predicted value for each population, quantiles on coefficients, R^2 and a Bayesian p-value. These standardized objects are used to produce results and model evaluation plots by the 'plotting_functions.R' script. The folder '/pre-run_model_output' also contains the model evaluation .pdf for each fitted model.

References

Su, Y.S. & Yajima, M. (2014) *R2jags: A Package for Running jags from R*. URL `http://CRAN.R-project.org/package=R2jags`. R package version 0.04-03.